

## RESEARCH OUTPUTS / RÉSULTATS DE RECHERCHE

### Integrated Information System for Multi-criteria Management of Orthopedic Infections

De Nizza, Damien; Ortiz Vega, James Jerson; Meurisse, Hubert; Schobbens, Pierre-Yves

*Publication date:*  
2012

*Document Version*  
Publisher's PDF, also known as Version of record

[Link to publication](#)

*Citation for published version (HARVARD):*

De Nizza, D, Ortiz Vega, JJ, Meurisse, H & Schobbens, P-Y 2012, 'Integrated Information System for Multi-criteria Management of Orthopedic Infections'.

#### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

#### Take down policy

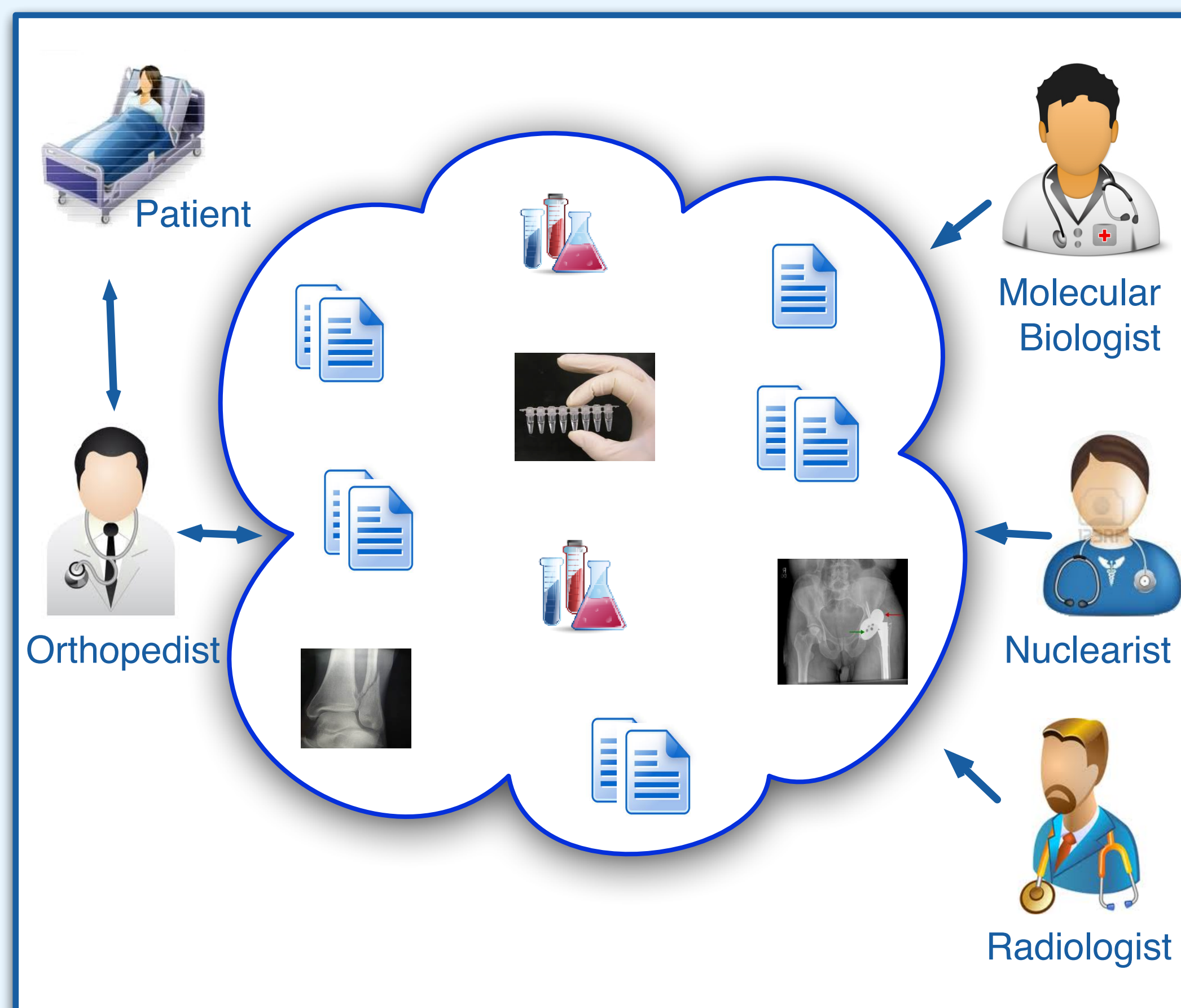
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.



## Motivating Context

### Orthopedic Infections Diagnosis

- **Complex**
  - Many infections lasting several months
  - Unadapted Antibiotherapy : Multi-resistant Bacteria
  - Septic vs Aseptic (chronic infections)
  - => Pluridisciplinary approach
    - Imaging
    - Patient History
    - Aspirates/Biopsies
  - Few/no integration
  - Local guidelines
- **Long and Tedious**
  - Bacteria Identification (conventional culture methods)
    - Slow growth : from two day to two weeks
    - Living bacteria create risks of contamination
    - Many False negatives
  - Slow Evolution (several months)
- **Expensive**
  - Repeated Hospitalizations
  - Repeated Imaging



### Problem Analysis

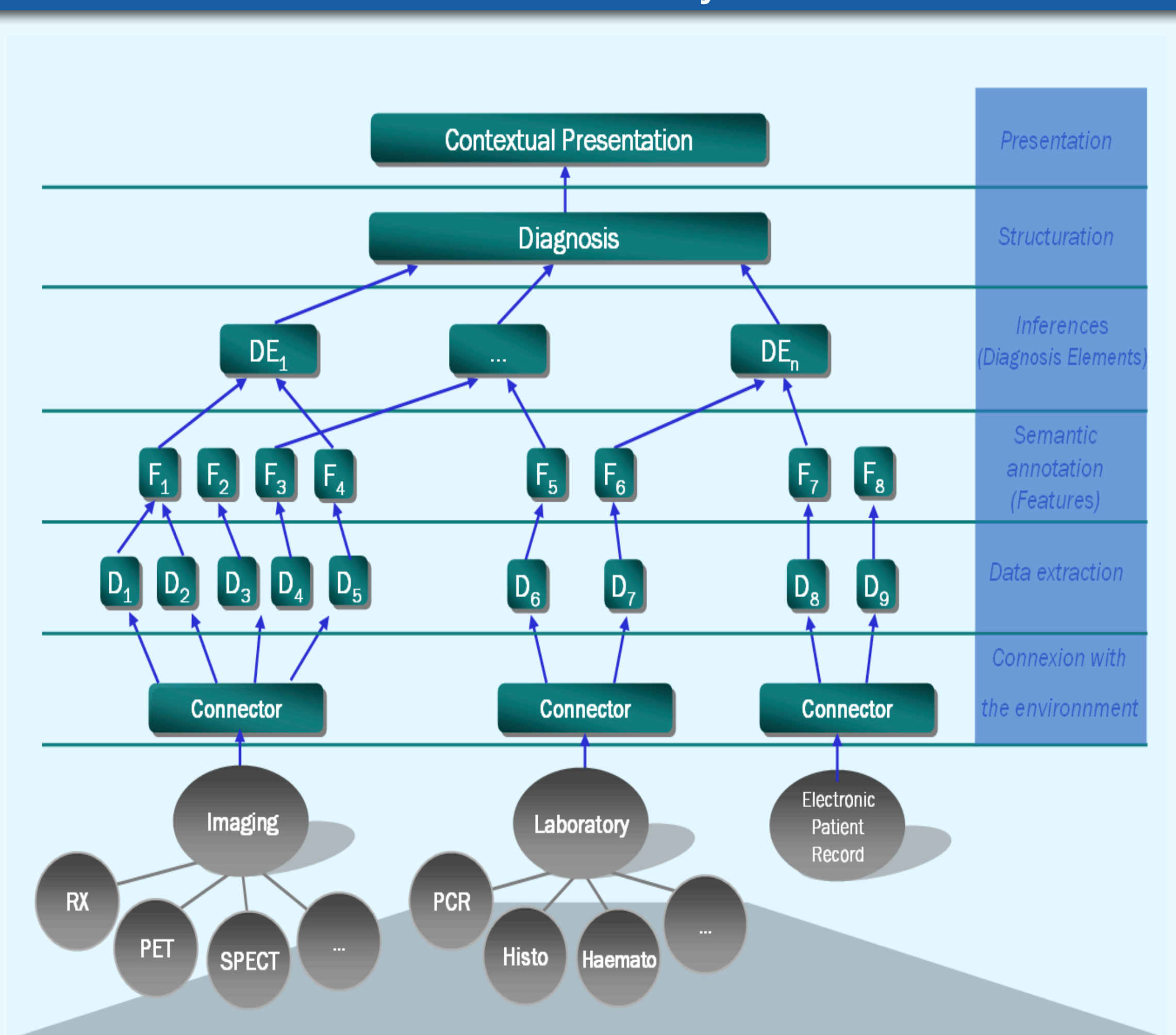
- **Decision Problem (DP)**
  - Making a diagnosis
    - $\Leftrightarrow$  DP (Pattern classification)
      - Features pattern  $\Rightarrow$  Pathology
  - Mathematical formalization
    - Pathologies  $\Leftrightarrow$  Classes/models
    - Features (functional/descriptive properties)
  - Structuring the Decision Process
    - DP identification (Discriminative features)
    - DP structuration (Business rules)
    - Solution selection (Reasoning)
- **Complex Diagnostic Environment**
  - Heterogenous data
  - Cooperation (different areas of expertise)
  - Iterative process (prospecting, guidelines)
  - Interaction with hospital entities (standards)
- **Constraints**
  - Uncertainty
  - Adaptability

## Challenge

### Integration System

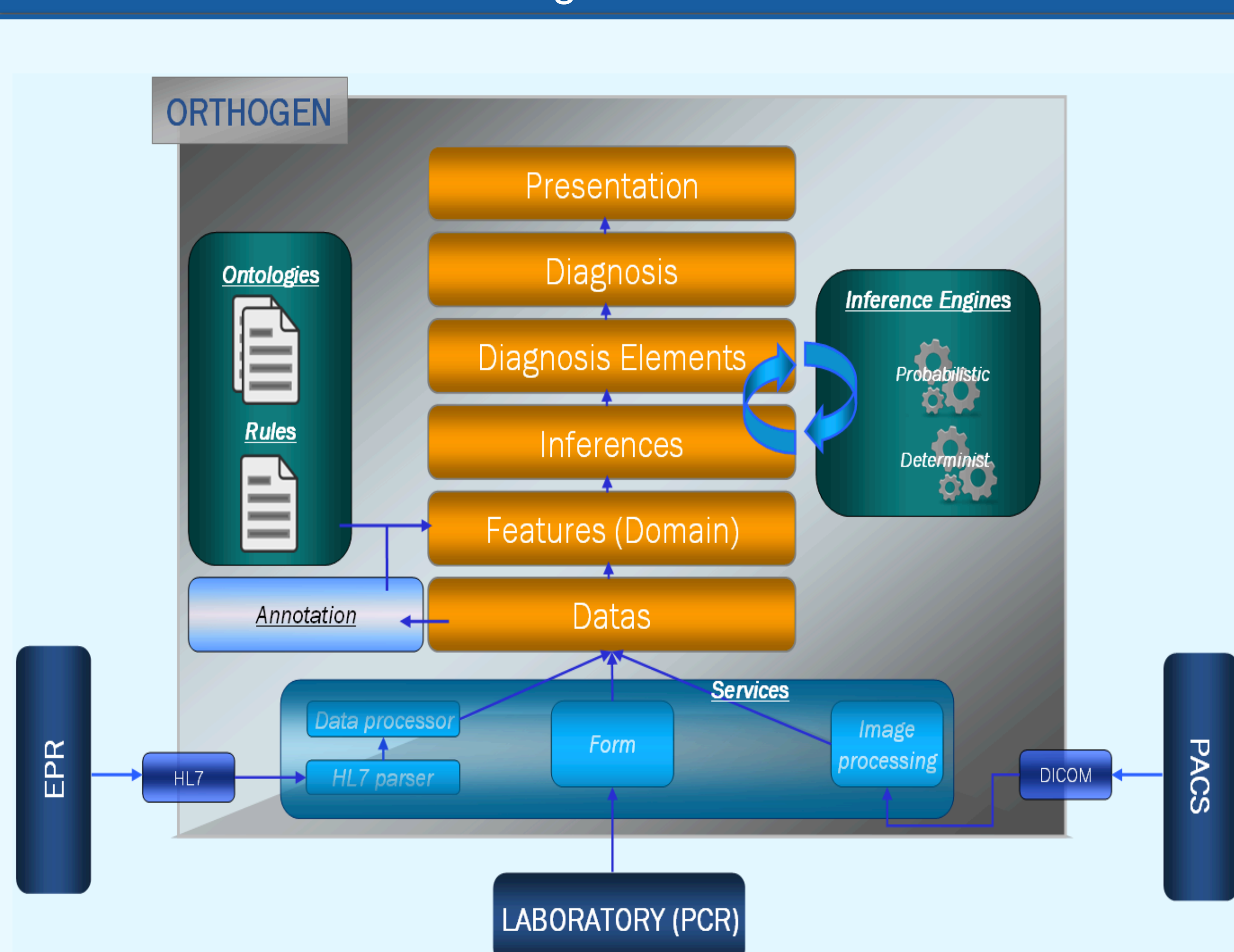


### Abstraction Layers

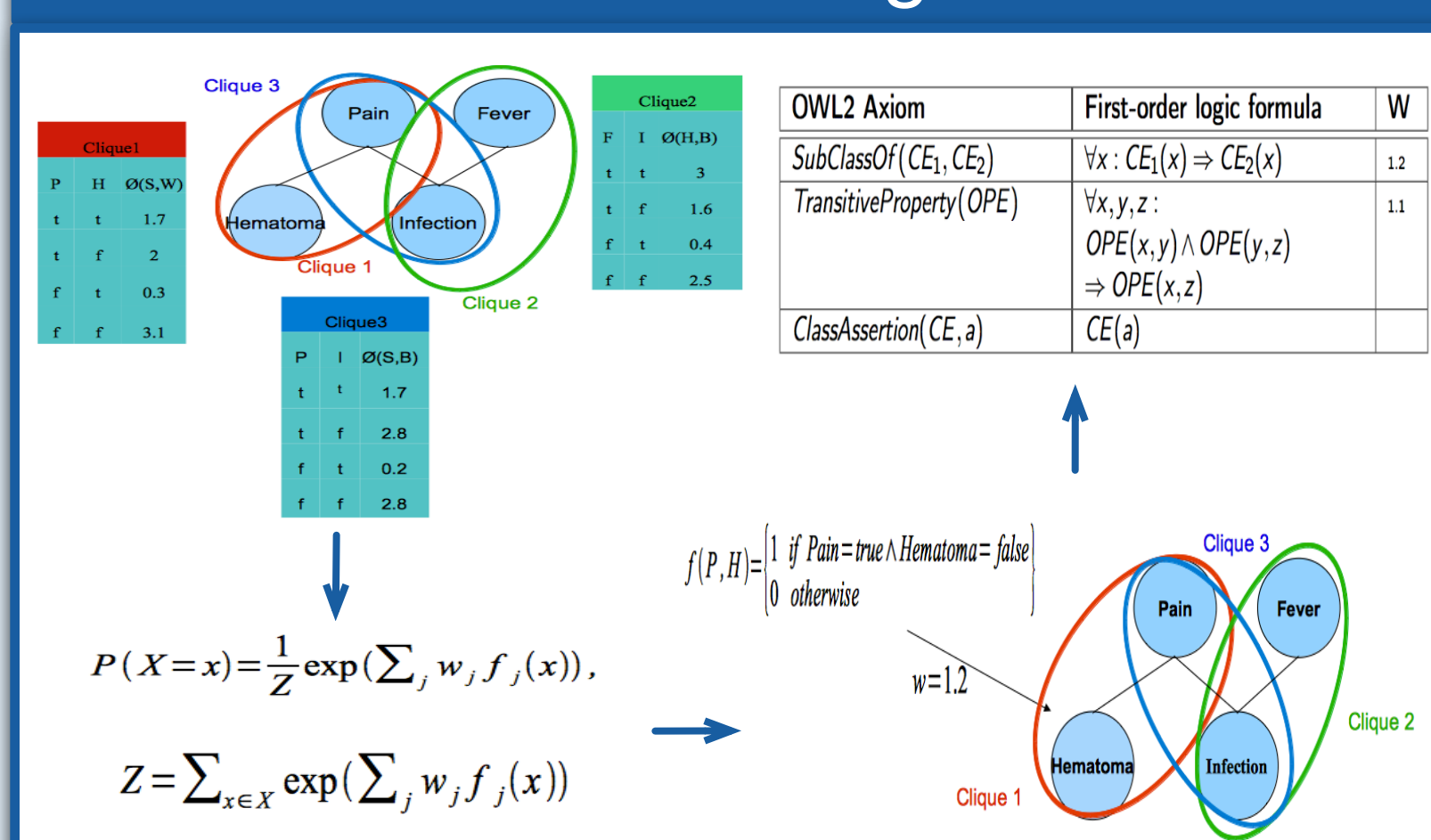


## Orthogen Model

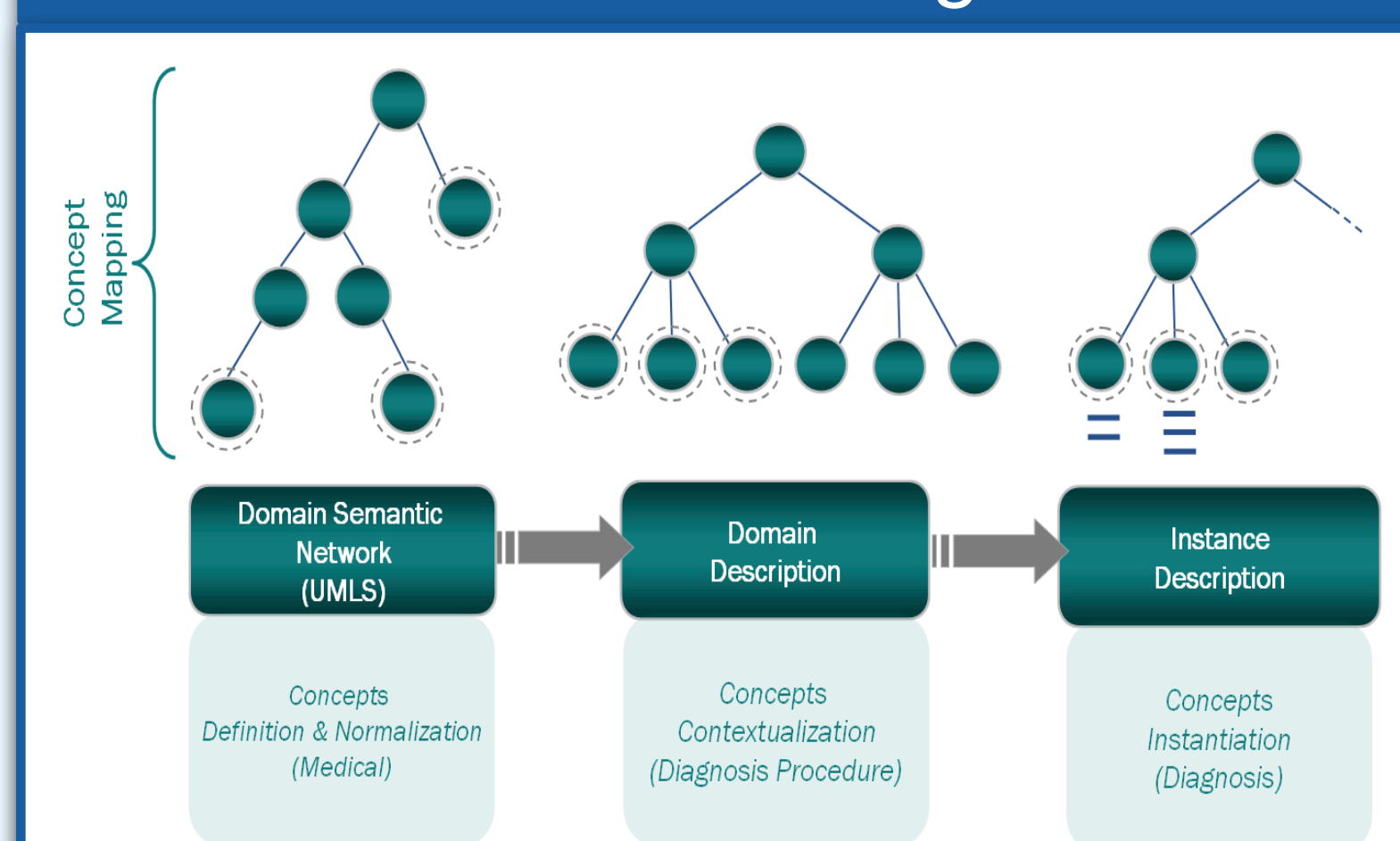
### Logical View



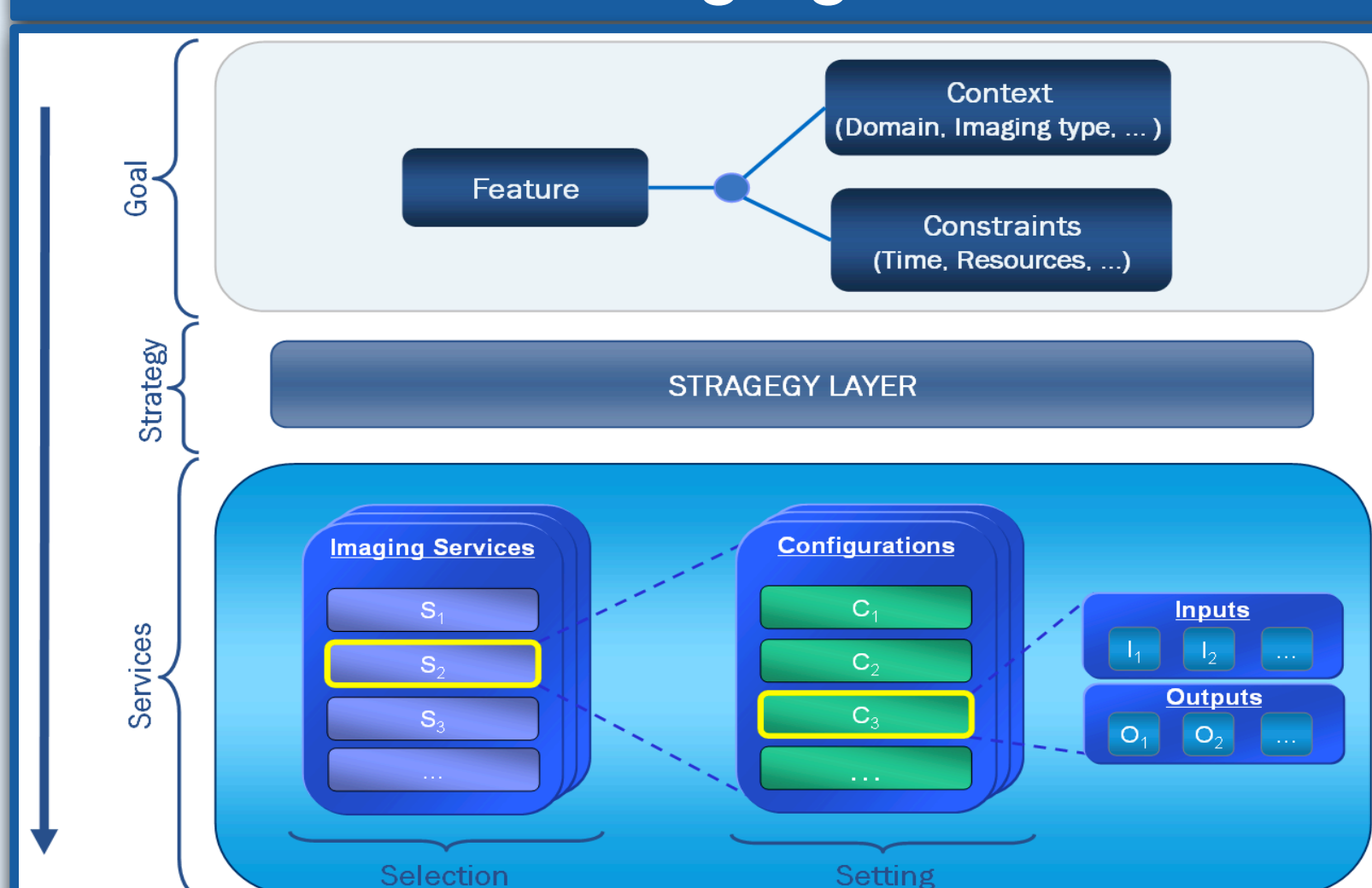
### Markov Logic



### Modular Ontologies



### Imaging



### PCR

